

the evidence of Mr. Henry Cunynghame, Mr. Davis, of Birmingham, and Profs. Unwin and Perry. Mr. Ricks, one of the Board inspectors, has drawn out an elaborate scheme for the development of the Kindergarten system throughout all the standards of a school in the directions spoken of.

Girls are more fortunate than boys in the matter of manual instruction. They are taught needlework universally, and very often cookery. The latter may be considerably extended. Domestic economy also in its various branches should be taught, through practical work, and with reference to scientific principles—as in washing, laying fires, and ventilating rooms.

But how is time to be obtained for the introduction of this perceptive and practical instruction? On that point the Committee are very distinct, and there is a singular unanimity among the witnesses that the attention now paid to spelling and grammar is excessive, if not educationally worthless. There is a curious table, too, in the appendix, which gives the results of inquiry as to the subjects of instruction most or least preferred in the various schools. Grammar is so unpopular with both boys and girls that it almost always attains that bad pre-eminence. Spelling or dictation comes second. In fact there is no doubt that the children dislike what they feel does not add either to their pleasure, or their real knowledge. It is proposed “that the time now given to spelling, parsing, and grammar generally, be reduced.”

There are two points on which we should have liked to see some recommendations of a more vigorous character. The one refers to the teaching of arithmetic, which as laid down by the Code is thoroughly unscientific. The other point is this: there are recommendations in regard to evening classes, the more extended use of the pupil-teachers' schools, and the grouping together of the upper standards of several schools in poor neighbourhoods; but this might have been carried much further, and have included the establishment of such valuable institutions as the central schools which are doing such good work in many of the provincial towns, especially in the North of England.

Nevertheless, these recommendations, if they are all allowed to take effect, will mark an era in education. The Special Committee are happily able to add: “It is significant that these changes are demanded alike by educational theorists, teachers, men of science, leaders of industry, and statesmen, and it rests with the Board to carry them into actual fact.” The Bill of Sir Henry Roscoe, and that on technical education which is promised by the Government, must also have an important bearing on the scientific development of elementary instruction. We await the results of the discussions that must ensue with the deepest interest.

THE NERVOUS SYSTEM AND THE MIND.

The Nervous System and the Mind: a Treatise on the Dynamics of the Human Organism. By Charles Mercier, M.B. (London: Macmillan and Co., 1888.)

THE time may come when the psychological historian will be required to trace the genealogy and career of such terms as “molecular movement,” “discharge,” “explosion,” “unstable matter,” as applied to mental

operations, as well as the familiar expression “environment.” Whoever else may have contributed to their use, they will be traced back in the main to Herbert Spencer. When once the brain was recognized as the organ of mind in a special sense, chiefly through phrenological observations in which Mr. Spencer was himself at one time engaged (he was, if we mistake not, a member of the London Phrenological Society), the physical basis of mind was naturally described in terms applied to material bodies and employed in physics. The combination of atoms forming molecules being regarded as the fundamental element of the substance of the nervous system, molecular movements were correlated with mental operations. Every corpuscle in the gray matter of the convolutions of the brain was regarded as “a reservoir of molecular motion.” It followed that the destructive molecular changes of which the granular protoplasm in the corpuscles is the seat were accompanied by a disengagement or discharge of motion. For the purpose of decomposition or waste, the amount of which is the measure of the force evolved, the remarkable supply of blood received by the cerebral convolutions was seen to be necessary; as also for the recombination or repair which succeeds waste. Spencer drew some of his analogies from chemical explosions, taking for instance the explosion of the percussion cap and powder in a pistol to symbolize the setting up of decomposition in an adjacent ganglion-cell by (in the case of the retina) a disturbed retinal element. He showed that a partially-decomposed ganglion-cell propagates a shock through the afferent nerve to a large deposit of “unstable matter” in the optic centre, “where an immense amount of molecular motion is thereupon disengaged.” The transmission of waves of molecular motion through nerve-fibres is compared by Spencer to “a row of bricks on end, so placed that each in falling knocks over its neighbour. . . . Each brick, besides the motion it receives, will pass on to the next the motion it has itself gained in falling.”

These and similar propositions have for long become household words. The terms referred to have become a part of psychological, and to a large extent medical, language. One well-known outcome of Spencerian teaching has been its elaborate application to the study of epilepsy, by Dr. Hughlings Jackson, who has been always anxious to acknowledge the source from which he drew his inspiration. Dr. Mercier's book is another stream from the same source. He makes an acknowledgment of similar indebtedness in his preface. We do not think he is justified in his complaint that “the classical works on Mind ignore altogether its association with the body, and study it from a stand-point so purely introspective as to offer no obvious advantage to the alienist, to whom the concomitant disorders of body are so conspicuous and so important.” Holding this opinion it became “absolutely necessary” for Dr. Mercier to prepare the present volume. The writings of Bain, Laycock, and Maudsley, no less than Spencer, are nothing if they do not insist upon the association of mind and body. The very last charge that can be fairly brought against these classical works is that they altogether ignore their correlation. The best evidence of the direction and complexion of the teaching of authors of modern works on psychology is contained in Dr. Mercier's statement that “everyone

nowadays admits that the evolution of mind and the evolution of the nervous system proceeded *pari passu*, and indeed are but two aspects of the same process." It is hardly consistent with a further statement that this way of regarding them is not only neglected but "derided and scouted." Dr. Mercier asks for our sympathy for having been for the last ten years as "the voice of one crying in the wilderness." Other voices, however, have for long been heard there, if indeed that can be called a wilderness which is peopled by the number who admit the above-mentioned proposition in regard to the evolution of the mind and the nervous system.

This work expounds Spencerian doctrines with much fulness of diction, and in a style which is forcible, not to say somewhat dogmatic. We find Spencer's illustration of molecular movements from bricks on end reproduced, and we may quote the following passage as a fair example of the author's style:—

"Imagine a brick set up on end. To do this requires the expenditure of force. Now, if the ground is shaken the brick falls, and liberates in falling a force equal to that expended in raising it. Again, imagine a brick set on end with another brick placed across the top of it. The upper brick can now be knocked off the lower, and the force which raised it be liberated, while the lower brick is left standing, with the force that raised it still in store. It is evident that a brick balanced on the top of another one will be displaced by a gentler shake than is required to knock down the single brick. . . . Now suppose more and more bricks are added until we have quite a complicated structure composed of loose bricks. It is easy to see how readily a top brick could be knocked off. . . . Now if we imagine these bricks to be connected to the pile by elastic bases, so that when they have been knocked down they will slowly rise again, with perhaps a little help, to their erect position, we shall have a diagram which will represent very roughly what we suppose to be the mechanism of the nervous discharge" (p. 23).

Dr. Mercier's copious vocabulary clothes an idea in many folds of attire. It is, we think, sometimes overloaded and too diffuse. Endowed with a large organ of comparison, he illustrates his theme with a redundant variety of illustrations or makes one illustration do duty in many forms. Great facility of expression enables him to enforce his views, though it may be at the risk of producing weariness by excessive iteration. He revels in the description of molecules—their form, their relative position, their polarity, their life, their behaviour, and their destiny. M. Renan has been said to know more about St. Paul than the apostle knew himself. Similarly Dr. Mercier would, we are quite sure, be found to know more about the molecules of the brain than, were they gifted with consciousness, they would know themselves. He might write a charming story entitled "The Biography of a Cerebral Molecule." The author divides his subject into three sections: Nervous Process, Conduct, and Mind, the first underlying the other two. In treating of "nervous discharge" he argues that the building up of a molecule implies force; this remains latent, stored up in the gray matter. It is liberated at intervals—that is, during functional activity. The rearrangement of atoms in the molecule may be called "decompounding," while the process of destruction is more properly termed "decomposition." Thus, then, the former, together with the liberation of force accompanying it, is the "dis-

charge." It tends to spread. How is the liberated force replaced? Dr. Mercier cannot tell. All that can be said is that it is a part of the general system of bodily nutrition. Passing on to "nervous resistance," it is assumed that there is a balance of tension and resistance in the gray matter of the brain. The subject is worked out ingeniously, and as fully as it admits of. Necessarily much is altogether inferential. The hypothetical nature of the doctrines taught by the Spencerian school no doubt deters not a few from adopting them. Such persons say that they are not scientifically proved, and they challenge those who insist on their importance to show that they can practically help the physician in his treatment of mental affections. A homely simile illustrates the doctrine of continuous resistance. A charged soda-water bottle resembles the tension of a charged nerve-cell. Withdraw the cork, and the resistance of the narrow neck causes an intermittent escape. The contents "come blobbing out in a succession of intermittent bursts," and so, according to the author, the narrow necks of nerve-cells—the fibres which proceed from them—cause analogous results.

One chapter is devoted to the co-ordination and inhibition of muscular action. Nervous discharges are regarded in terms of the latter. The discharge of an area of gray matter occasions normal movements. The simultaneous beginning, duration, and ending of muscular action depend upon the simultaneous issue of a current of force to each muscle under its influence (p. 67). The nerves of muscles connect them with the cells of the gray matter of the brain, and muscular force depends upon the amount of nerve-discharge. Co-ordinated movements are secured by the group of nerve-elements called a nerve-centre. The initiatory impulse may come directly from the outside world—the environment. In some instances, however, this action is indirect and distant, as, when reflection ends in acts set going by "currents starting from the highest centres." To terminate the action set up, another stimulus is necessary, unless exhaustion itself terminates it. Here comes in the element of control or inhibition to which all nerve-centres are presumed to be subject, and by which they are retained in a condition of mobile equilibrium as surely as the planets in their orbits by the opposition of attraction to their own inertia. It is forcibly argued that this influence is derived from centres having other functions, and not from one exclusively set apart for this purpose. Inhibition is, in short, a higher degree or power of the resistance which causes the intermittent escape of nervous force. A wide question is here raised, and there is not as yet a consensus of opinion among physiologists in regard to it. "Movements" are dealt with in much detail. The section on the co-ordination of movements is an elaborate study of the subject. In the discussion of the nervous mechanism of co-ordination and inhibition, occasion is taken to give a minute description of Jacksonian epilepsy. In inhibition the centres which supply the impulse to start and accelerate, supply also the impulse which arrests and retards. In walking, for instance, the centres which actuate and regulate it are so arranged that they control those below, they themselves being under the control of still higher centres. If the action of the head-centre is suspended, the local and vegetative functions

are still performed. There is no paralysis. The early stage of drunkenness is a good example. There is the uncontrolled action of the centres usually subordinate to the highest controlling, but now non-functioning, centre. There is in such an instance, "the withdrawal of the stimulus of frequent positive impulses." In later stages there is something more than temporary suspension or inhibition; there is destruction of the highest centres and actual paralysis. Under "Conduct" Dr. Mercier considers the human organism and the environment along with the adjustment of the former to the latter. He carefully follows the lines of Spencer, and points out that the study of mind belongs neither to the first nor to the second, but only to their adjustment.

Our space does not admit of our following the author in his study of the "Constitution of Mind," in which he endeavours, with, we think, imperfect success, to prove that the feelings cannot be disordered without disorder of the intelligence. Were this theoretically true, so far from having a "practical bearing of great moment," it would be an instance of an abstract theoretical proposition being, strictly speaking, true, while for all practical purposes experienced alienists tell us they find it necessary to admit a moral insanity with an average amount of intelligence. Alienists will no doubt discuss this and other conclusions stated in the third part of this work, and we leave the task in their hands. The most original portion of the work is that in which Dr. Mercier classifies cognitions and feelings, dissenting as he does from the classification of Spencer in several important particulars, upon which we cannot enter.

There will, of course, be the same criticism on the position taken by the author as is frequently offered to that of his master. True, there is no denial of mind; on the contrary, emphasis is laid upon the absolute distinction between mind and matter; but the complaint will be made that all the functions of life are explained by the brain's molecular and molar action in adjustment to environment, without taking into account the influence of what is admitted to be "mind"—in other words, thought and feeling. The circle, it will be objected, is completed without allowing for the action of at least one important factor. Dr. Mercier, for instance, writes to this effect:—"He who gets himself vaccinated is procuring a change in his constitution adapted to the existence in the outside world of the contagium of small-pox. He is procuring the adjustment of his organism to a set of conditions in his environment." What, asks the objector, is the position of the "he"? In what relation does this personal pronoun stand to the organism? How is it possible to ignore it in the explanation of mental manifestations, or what is called the adjustment of organism to environment?

Dr. Mercier advances no further than his predecessors in enabling us to answer these questions. It does not help us to insist upon the "fathomless abyss" that separates mind from matter. We get no further under his guidance than the "rearrangement of molecules in the gray matter of the superior regions of the nervous system." We are told that no process of change in the latter can cause a change of consciousness. To Dr. Mercier's mind this is "unthinkable"; therefore it is not to be thought of. Equally unthinkable is the proposition that a change in consciousness can cause a change in

molecular arrangement. The two changes are, it is said, invariably simultaneous. No doubt, as the author says, the student who grasps these notions has half his difficulties surmounted. To overcome difficulties, however, by evading them and confessing our ignorance is somewhat dispiriting, and some would think pusillanimous. Dr. Mercier, while granting the existence of mind on the one hand, and movements on the other, will neither allow of such expressions as "psycho-motor" nor give us an equivalent; for the terms he himself employs exclude the mental factor altogether, although he is forward to admit its existence. There is a break in the circuit, and yet the latter is presented to us as if it were complete. On the remaining links of the chain, the work before us is a painstaking and connected, and therefore valuable, dissertation. If this missing link can only be postulated, and cannot be brought within the range of practical psychology, it must be acknowledged that the science is defective in a most essential particular. If the relation between mind and matter is unthinkable, it is not alleged that mind is so, and therefore there does not seem to be any scientific objection to the employment of terms which recognize some causal relation between mind and matter. Still less do we find in the employment of such terms the "blasphemy" which so painfully grates upon the psychologically tender conscience and rigid orthodoxy of our author. Seeing, moreover, that there is an appreciable lapse of time between an idea or willing, motion, the whole of which need not be occupied in the transmission through nerve-fibres, there seems at least as much justification for using the term "ideo-motor" as many terms which describe or imply a theory which, like Dr. Mercier's own hypothesis, is confessedly inferential. And further, the expression may be, like a host of others, defective in comprehensiveness and precision, and yet be the most easily understood.

In conclusion, we would say that Dr. Mercier's work may be read with profit by the class for which it is intended, so long as it is understood that it treats of only one aspect of the relations between mind and body, and so long as it does not obscure the recognition of those great truths of cerebral physiology and mental pathology, which are not in dispute, and the teaching of which will continue to enlighten the student of psychology, when the theories of the philosophers are exploded or forgotten.

POPULAR METEOROLOGY.

L'Atmosphère—Météorologie Populaire. By Camille Flammarion. (Paris: Librairie Hachette et Cie., 1888.)

THIS is a re-issue of a popular work that first appeared in the year 1872, and which has been enlarged and brought up to date.

Of all the subjects which are interesting not only to men of science but to people in general, there are few more important than that of the atmosphere, since, without its aerial envelope, our planet would pursue its path round the sun in silence and without life, as is the case with our moon, which bears evidence on its surface of nothing but death and desolation. The existence of an atmosphere makes all the difference in the world to a